

Product Preview  
**Phase-Frequency Detector**

The MC100LVEL40 is a phase/frequency detector intended for phase-locked loop applications which require a minimum amount of phase and frequency difference at lock. The device is a basic three state phase detector with differential inputs and outputs. The device is designed to work from either a 3.3V or 5.0V power supply.

When the reference (R) and the feedback (FB) inputs are unequal in frequency and/or phase the differential up (U) and down (D) outputs will provide pulse streams which when subtracted and integrated provide an error voltage for control of a VCO.

- 250MHz Typical Bandwidth
- Small Outline 20-Lead SOIC Packaging
- >2000V ESD Protection

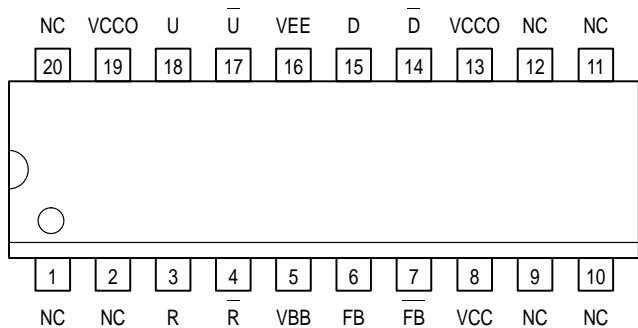
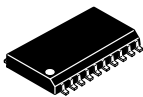


Figure 1. 20-Lead Pinout (Top View)

**MC100LVEL40**



**DW SUFFIX**  
20-LEAD PLASTIC SOIC WIDE PACKAGE  
CASE 751D-04

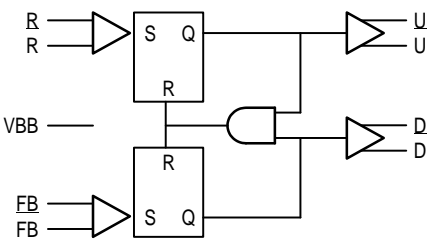


Figure 2. Logic Diagram

**3.3V ECL DC CHARACTERISTICS** ( $T_A = -40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ ;  $V_{EE} = -3.0\text{V}$  to  $-3.8\text{V}$ ;  $V_{CC} = \text{GND}$ )

Symbol	Parameter	-40°C			0°C to +85°C			Unit
		Min	Typ	Max	Min	Typ	Max	
V <sub>OH</sub>	Output HIGH Voltage	-1085	-1005	-880	-1025	-955	-880	V
V <sub>OL</sub>	Output LOW Voltage	-1830	-1695	-1555	-1810	-1705	-1620	V
V <sub>IH</sub>	Input HIGH Voltage	-1165		-880	-1165		-880	V
V <sub>IL</sub>	Input LOW Voltage	-1810		-1475	-1810		-1475	V
I <sub>IL</sub>	Input LOW Current	0.5			0.5			μA
I <sub>EE</sub>	Power Supply Current		45			45		mA

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# MC100LVEL40

## PECL DC CHARACTERISTICS ( $T_A = -40^{\circ}\text{C}$ to $85^{\circ}\text{C}$ ; $V_{CC} = V_{CC}(\text{min})$ to $V_{CC}(\text{max})$ ; $V_{EE} = \text{GND}$ )

Symbol	Characteristic	$-40^{\circ}\text{C}$			$0^{\circ}\text{C}$			$25^{\circ}\text{C}$			$85^{\circ}\text{C}$			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$V_{OH}$	Output HIGH Voltage <sup>1</sup> .	2.215	2.295	2.420	2.275	2.345	2.420	2.275	2.345	2.420	2.275	2.345	2.420	V
$V_{OL}$	Output LOW Voltage <sup>1</sup> .	1.470	1.605	1.745	1.490	1.595	1.680	1.490	1.595	1.680	1.490	1.595	1.680	V
$V_{IH}$	Input HIGH Voltage <sup>1</sup> .	2.135		2.420	2.135		2.420	2.135		2.420	2.135		2.420	V
$V_{IL}$	Input LOW Voltage <sup>1</sup> .	1.490		1.825	1.490		1.825	1.490		1.825	1.490		1.825	V
$V_{BB}$	Output Reference Voltage <sup>1</sup> .	1.92		2.04	1.92		2.04	1.92		2.04	1.92		2.04	V
$V_{CC}$	Power Supply Voltage	3.0		3.8	3.0		3.8	3.0		3.8	3.0		3.8	V
$I_{IH}$	Input HIGH Current			150			150			150			150	$\mu\text{A}$
$I_{IL}$	Input LOW Current													$\mu\text{A}$
	R, FB	-300			-300			-300			-300			
	Others	0.5			0.5			0.5			0.5			
$I_{EE}$	Power Supply Current		45			45			45			45		mA

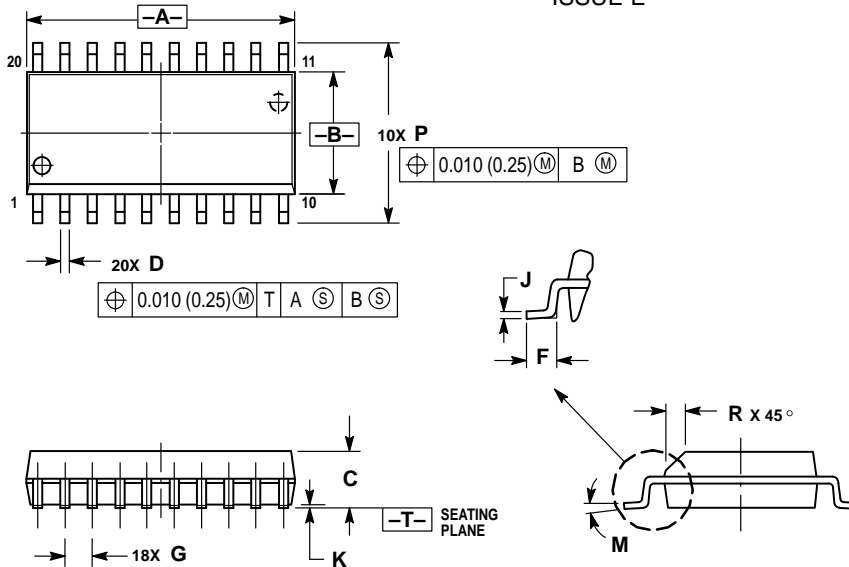
1. These values are for  $V_{CC} = 3.3\text{V}$ . Level Specifications will vary 1:1 with  $V_{CC}$ .

## AC Characteristics ( $T_A = -40^{\circ}\text{C}$ to $85^{\circ}\text{C}$ )

Symbol	Parameter	Min	Typ	Max	Unit
$f_{\text{max}}$	Maximum Toggle Frequency		250		MHz
$t_{\text{PLH}}$ , $t_{\text{PHL}}$	Propagation Delay R to D R to U FB to D FB to U		1100 450 450 1100		ps
$t_r/t_f$	Output Rise/Fall Time		350		ps

## OUTLINE DIMENSIONS


**DW SUFFIX**  
**PLASTIC SOIC WIDE PACKAGE**  
**CASE 751D-04**  
**ISSUE E**



## NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.150 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13 (0.005) TOTAL IN EXCESS OF D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.65	12.95	0.499	0.510
B	7.40	7.60	0.292	0.299
C	2.35	2.65	0.093	0.104
D	0.35	0.49	0.014	0.019
F	0.50	0.90	0.020	0.035
G	1.27 BSC		0.050 BSC	
J	0.25	0.32	0.010	0.012
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	10.05	10.55	0.395	0.415
R	0.25	0.75	0.010	0.029

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